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SCIENCE

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SCIENCE OR ATHLETICS?¹

THERE has never been a period in the history of science when educational questions relating to its advancement have appeared to possess such interest or when discussions have dealt so freely with the shortcomings of the educational system in its relation to the training of students of science. On the one hand is an intensely practical industrial world, insisting upon a close scrutiny of the content of the college courses and of the methods used in administering them,—from the standpoint of their immediate practical application to industrial problems and from this standpoint alone,—while on the other is the world of the college teacher, seeing or thinking it sees much in science and in the teaching of science that is not to be judged in this limited fashion. We are turned this way and that in the attempt to see all viewpoints and to make use of all constructive advice. We desire that our students shall be as well equipped as possible in whatever of science it is possible to teach them in the time that is allotted to us, so that when they leave us to take up their share in the general advancement of science they shall be able to acquit themselves honorably and to add whatever they may in the application of science to the problem of increasing the happiness and comfort of humanity.

Chemical education has not been spared in this discussion. Rather has it been the center of the major part of the discussion, for in no other single science has there been so spectacular and so amazing a success in research and in the tangible results of the application of research to practical problems. It has therefore come about that there is no other science in which it is more important that the college

¹Read before the Section on Chemical Education at the Birmingham meeting, April, 1922. Contribution from the Department of Chemistry, Purdue University.

and the university shall succeed in evolving proper and effective methods for the scientific training of the youth of the land, since it is upon the mental equipment and the mental habits of our present and future students that the future of the science depends.

I propose to discuss certain phases of this subject from the standpoint of the college teacher. We respect the viewpoint of those practical men who, like Mr. Edison, feel that about the only trouble with the college graduate is that he knows nothing and is good for nothing, also of those other, perhaps broader minded, technical men who recognize the value of college training but who believe that the teachings of the class room and student laboratory are too far removed from the problems and methods of industrial applications. We also realize that some of our eminent research chemists are insisting that the college and the university should busy themselves with fundamental principles and that they should keep hands off the plant processes, while others are equally emphatic in the view that research should be more along practical lines.

Without, at present, presuming to argue any of these questions and respecting the integrity of all who offer them, we respectfully submit that in the effort of the college teacher to administer courses of training, either routine or research in purpose, there are certain factors that constantly baffle and discourage, that these factors are to a considerable extent under the control of some of those who complain of our shortcomings and even that the continuance of such conditions is directly traceable to the activities of some of the critics. This may seem to be a statement that requires justification.

I take it that every one will agree that the study of chemistry as a preparation for successful research or for work in the application of chemistry to practical problems is an enterprise that calls for the concentration and supreme effort of high grade intelligence. Any person who expects to devote merely left-over energy and surplus thought to superficial aspects of any science,—and especially of chemistry,—is foreordained to a career of attainment that is mediocre or worse. The stu-

dents of chemistry of past years who consistently followed the practice of "living the life" in college, making of themselves "all-around men" by the time-hallowed practice of taking part in every possible activity on the campus and off it, except the one for which they paid their money and for which they sacrificed the best years of their lives,—these men, with few exceptions, now make up the army of fillers of small positions, doers of small things and thinkers of small thoughts. They have a certain routine part in the routine affairs of science but when they are gone their places will easily be filled by others who have followed the same line of reasoning and of conduct.

The college teacher who is dull and uninspiring in his contact with students will have a class of dull and uninspired students. This, no matter how well trained he may be or how earnestly he may desire to fulfill his mission as a teacher. But if the teacher is all that we may desire to see in a teacher:—well grounded in his subject, of broad vision and purpose, energetic, inspired and inspiring,—he may fire his students with boundless zeal for the things and deeds of science, he may grip their intellects and emotions while in the class room or laboratory, he may fill them with the highest kind of resolve for high endeavor, but he can not make true students of science of them when the whole atmosphere of the college is that of one grand hurly-burly of everything under heaven except study. Every teacher who hears this or who reads it knows that, to far too great an extent, this is the atmosphere of the modern American college. Some of our atmospheres are better than others,—or we might even say that some are worse than others. But when the student goes out from his session with the best teacher in the best college in the land he immediately finds himself in the midst of a multitude of distracting circumstances, events, activities and enterprises. It can not be denied that the effect of this is to lower the efficiency of the student, to weaken his mental resolve for high accomplishment and to render impotent much of the effort that has been expended by the instructor. It has repeatedly been emphasized that extra-curricular activi-

ties play a large part in the development of character and in the making of men who can deal with men. I am not denying this. Rather, I assent to it and give it emphasis. But I add, also, that the undue *multiplication* of student activities and campus side-shows plays an ever increasing part in the pulling down of the educational system with which we have labored so carefully and so painfully, and in the dissipation of the scientific efforts of those who should be our best students. Superficial training is the inevitable result and superficial training and narrowness of viewpoint are the blight of our system of scientific education to-day.

Many of our American colleges make an advertising point of the large numbers of students who flock to their doors, but I believe that it is no exaggeration to say that if we could exchange our annual crowds of graduates in chemistry, immature in intellect, unsettled in purpose and under-done in real scientific education as too many of them are, for a small fraction of this number of young men and women of good minds, well grounded in fundamentals, possessing a broader culture and accustomed to profound thinking on serious matters, the world at large and the science of chemistry would be immeasurably benefited. That we are, even now, occasionally finding some of these minds and doing something toward their proper development is cause for real rejoicing. That we might find and develop more of them if conditions were changed is a proposition that will bear examination.

What, then, is to be done about this question of the dissipation of the youthful fire of our students among the hundreds of non-essentials of college life? Change it, of course, say our critics. Exactly. And if our American colleges were now, in the truest and most complete sense of the word, "educational institutions" this would not, I verily believe, be a particularly difficult or perplexing undertaking. But, fellow scientists, our American colleges are to-day waking into the realization that they have somehow developed a *liason* with an organization that not only is not educational in its purpose,—it is actually one of the most insidious destroyers of educational standards

that we have to combat to-day. This organization is no other than the modern highly commercialized intercollegiate athletic system, financed by forces that care nothing for education and fostered by extravagantly paid coaches who trample all of the ideals of education under foot in their desire for personal glory and personal profit.

There is a perfectly legitimate and desirable field for college athletics. We desire that our students shall have systematic physical exercise because this makes for health and contentment and thus, indirectly, for scholastic success. We know also that the spirit of competition is an all-powerful incentive for excellence in any line of activity and the athletic game is the logical expression of this. But this idea has become almost entirely overshadowed through the development of a system that places the vast majority of our students upon the bleachers and concerns itself with an excessive degree of specialization with an almost negligible minority. A friend of ours has tritely stated that the American people have become afflicted with a disease which he calls "bleacheritis." They find their highest enjoyment in lounging on the side lines, entertained by mediocre "movies," bad vaudeville, athletic contests or any other novel spectacle, and they take too little interest in wholesome activity on their own part or in play for the sake of its effect upon their minds and bodies. Even the hysteria of the college "pep session" accomplishes only a temporary rousing from this apathy. The result, in college life, is the almost absolute failure of physical education to accomplish any important part of its mission to keep the bodies of our students healthy and their minds alert, and to turn them back into the class room and laboratory full of vim and enthusiasm for the most important work of their education. This can not fail to work harm to the scholastic success of the student. That it goes even farther than this and that it seriously affects the educational standards of our colleges is a fact which we can not safely ignore.

Within the past few months there has been an unusual amount of discussion of the matter of professionalism in college athletics. The colleges have come in for a great deal of criti-

cism and especially in a few instances where players have been disqualified from intercollegiate competition because of having participated in games of a semi-professional nature, and where there have been exposés of the attempts of coaches and others to influence prospective student athletes by the use of money. How much may we expect to accomplish by disqualifying a few players, here and there, or by the dismissal of a coach or two for the breaking of the rules regarding the payment of money to athletes? I think that we shall accomplish very little of a remedial nature by this sort of publicity unless we go considerably farther. These published cases of professionalism in students have been largely technical in their nature and it appears evident that the students in question do not feel any consciousness of guilt nor are they regarded as criminals by their fellows. The general public probably sees little in all this but a rather fantastic exhibition of hair-splitting and quibbling by college folk, who appear to magnify a purely technical offense into a serious case of law breaking. It is probably true that the majority of non-collegiate observers,—or at least of those who take an interest in athletic affairs,—sympathize with the players who are detected in what they regard as purely technical violations of unnecessarily strict technical rules.

The principal reason for all this is that the average person does not appreciate the real evil of professionalism in college athletics. He sees nothing inherently wrong in playing for money, any more than in doing any other legitimate thing for compensation. We have professional baseball and enormous numbers of us go to see it and feel that it is perfectly proper that gate fees should be charged and that the skilled players should be paid liberally for entertaining us. Why, then, should intercollegiate associations adopt such drastic rules against college athletic professionalism and why should faculties attempt to enforce these rules so rigidly? This is certainly not done solely in order to insure fair play in intercollegiate contests.

The fact is that mere playing games for compensation, in the college or out of it, is not

inherently immoral or wrong in any way, except as it may bear some relation to the vital concerns of the college in its efforts to promote true education. But we are insistent that the least taint of professionalism shall be kept out of our college athletics because we know that whenever we admit it we shade our scholastic standards. If petty, technical professionalism may enter then unlimited professionalism and commercialism to the last degree can not be excluded.

I am saying no more than what is fairly common knowledge when I state that there is a sort of underground activity to-day that is exerting every effort to circumvent and evade our regulations concerning amateurism. However much some of us may boast of the "cleanliness" of athletics in our various colleges, we all know perfectly well that the cases of violations of the rules that are occasionally brought to light are merely the more obvious ones. We disqualify our players for participating in a summer game in a village of a neighboring state but we harbor far more serious cases of real professionalism in the boys who are provided with workless jobs, fraternity homes and other outside-financed "education" in order that they may take important places on athletic teams. These boys are hunted out while yet in the secondary schools and they are brought to college and kept there by an organized effort on the part of men who, in some cases, care nothing for educational standards or for education itself, but who know athletic excellence when they see it and who are determined to have the best of it for the college of their choice. This work is done quietly, as a rule. Occasionally some novice in the business makes a slip and an uproar ensues. This has happened on several occasions, quite recently. As a result, it is apparent to a close observer that the interests that work for commercialism are now scurrying to cover. They realize that they have been riding to a fall and in order to save intercollegiate competition from the impending wreck they have become loud in their pharisaical professions of a determination to see that the law is obeyed and that college sports are kept clean. But even in this they are careful to keep attention focused upon the

summer-playing bugaboo, so that the more serious issues are obscured.

Visualize, if you will, the college teacher,—instructor, professor, department head or dean,—making his final summary of grades for the members of his classes or sending in his mid-semester reports of delinquencies. Imagine that you see the name of one of these star athletes upon the list of those who have been found wanting. No very vivid imagination is required to complete the picture. It is quite likely that many of our teachers are upright enough and strong enough to resist the pressure which will result. Also it is quite possible that many are not so strong. This is particularly true of the teachers who hold the more subordinate positions and who feel themselves less secure in their standing. And the assault against class standards is not, by any means, confined to actual threats against individual instructors. A more subtle influence in the form of a very human and a very universal desire for personal popularity and a lurking fear of loss of dearly earned prestige finally leads to the same result. As individuals and as faculties we feel more and more strongly a timidity in the enforcement of rules,—not only rules of scholarship but rules of every description. This, I am firmly convinced, is the basic cause for the now too obvious drift of our colleges toward laxness in morale and toward the lowering of the standards of work required of those who are to receive our degrees. The futility of our most earnest efforts toward inspiring and effective teaching becomes increasingly apparent.

Fellow chemists, this is a problem which affects all of us most vitally. We have had an enormous amount of publicity for the fact that American science was not, before the war, able to cope with German science and various reasons have been assigned for this undoubted fact. The efficiency of American science was suddenly increased, during our war period, by the spur of life-and-death necessity. But this spur no longer exists and if our chemistry,—research, applied or teaching,—is to continue to hold its own we must see to it that our young college graduates go forth into the struggle fully equipped with well trained minds

and hands,—well trained not only in the ability to do certain routine tasks that we have set for them in the colleges and universities, or in the ability to follow slavishly in the methods and habits of thought of their teachers, but broadly trained in scientific fundamentals, in general culture and in the ability to do independent and profound thinking on important matters of science and of life. This they do not now acquire as they could and as they should.

Whether or not you may agree with the conclusions I am about to draw, I do not believe that the essential facts as I have already stated them can successfully be denied. I do not believe that we can make any very great headway in our effort to stop the obvious decline in our standards of scientific education until we can succeed in limiting the distractions of campus activities to sane and reasonable values. We can not bring about this change until we divorce the educational system from the present commercialized system of intercollegiate athletics. And, finally, the incubus of commercialized athletics can not be shaken off until we throw out of our educational system all of our extravagantly paid professional coaches. For a fraction of a year of work we pay a football coach three or four times as much as an able and experienced professor in any other department will receive. We need not feel any surprise when we discover that he has done the best he could to earn this salary and thus to insure permanency in his position, or that he has employed every means in his power to obtain the best material for his teams, rules or no rules, and we need not expect that anything short of constant vigilance will serve to curb his extra-legal activities. His job is to develop a team that will be able to outplay the teams of approximately seven other colleges in as many contests of approximately forty minutes each, per season. He is going to do this to the best of his ability, regardless of cost, and we may think as we please about it.

Our colleges are spending relatively enormous sums upon athletic activities whose end is not, in any sense, physical development of the students but solely the winning of games and championships, while the educational needs are grievously suffering, through lack of sup-

port. This spectacle is not one that can be contemplated with equanimity by those who have faith in education and hope for its future development. We are losing the sense of perspective in educational affairs and we may not expect to elevate our colleges from a position of mediocrity in scientific training until we shall have reacquired this sense. This happy consummation is not to be attained so long as we remain in the present state of competitive hysteria or so long as we continue to provide disproportionate support for an activity that has no relation to scientific or other education except that of obstruction to it. I do not envy those colleges of the United States that are planning to sink millions in athletic stadia. I verily believe that the day will come when these colossal monuments to the suicidal folly of a so-called "educational" system will be an offense to the eyes of believers in true learning, for in that day we shall find it hard to convince our critics that we do not esteem the spectacle of two hundred and eighty minutes of actual playing of football each year as of greater importance than the training of American youth in the science of chemistry.

And now, in what way can there be any truth in the statement made in the earlier portion of this paper, to the effect that the men who are looking to the college to supply trained chemists, as well as trained scientists in other fields, are directly responsible for the continuance of this condition? Simply by this: that these people are, almost without exception, college and university alumni and that organized alumni activities concern themselves almost exclusively with efforts to further athletic successes in their colleges, to the neglect of opportunities to better educational conditions. This is certainly not because of any desire to hamper the educational work of the college. Quite the opposite is the case. They do not busy themselves so much with other modes of assistance, merely because for some reason it has not occurred to them that such assistance is possible. They believe that the college needs advertising and they have repeated so often that they nearly believe it, the old fallacy that athletic prowess is the best advertisement for institutions of higher learning.

I hope that I do not merit the appellation of "alarmist" but I do sincerely believe that the present condition and the present trend of scientific education is such as to give thoughtful people cause for concern, and I believe that we shall not get very far in our attempts to improve matters until we elect to discuss these things fearlessly and openly and then courageously to act upon our convictions. In the inspired words of Vernon Kellogg:¹ "It is incredible that in this all-important matter of getting our higher education straightened out we shall go on indefinitely acting as if we were helpless. Let the college or the university that wishes to do the greatest thing just now to be done for higher education and true learning in America step forward and boldly do the unusual thing. Let it devote the most of its energies to the most important part of its work. It will soon not be alone in its doing. It will become a prophet with honor in its own land."

The choice of courses is now ours. If we fail to exercise that choice in the name of true education and true science, we may later find that the decision has passed from our grasp. Or can it be that, as history has so often recorded of individuals, of organizations and of nations, we shall continue simply to drift until the accumulation of disaster shall shock us into realization?

E. G. MAHIN

BUGS AND ANTENNAE¹

Members of the Entomological Club of Madison, entomologists in various parts of the United States, and radio "bugs":

The Madison Entomological Club, as host,

¹ SCIENCE, 54: 19 (1921).

¹ A radio lecture given at the request of the Entomological Club of Madison, Wis., and broadcasted from the General Electric Company's station, "WGY," at Schenectady, N. Y., at 9 P.M., April 24, 1922. The transmission to Morgantown, W. Va., about 400 miles, was practically perfect, it being as distinct as though presented in a classroom. Unfortunately static or other conditions prevented it being heard at Madison, Wis., and seriously interfered at New Haven, Conn., and Wooster, Ohio.